

Relating information seeking behavior with digital literacy: A Survey of students in Sindh

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Abstract

The paper explored the relationship of information seeking behavior with digital literacy among students of Sindh, Pakistan. Quantitative research approach was used for this study. Data were collected through a structured questionnaire. Descriptive and inferential statistics were used to analyze data. According to the results, the respondents utilize a middle-range proactive information-seeking behavior where the search process is limited by overuse of social media and powerful search engines. Perceived obstacles to using digital resources to obtain information were rated highly by the respondents. The average results demonstrate that Sindh' students face substantial obstacles that have a negative influence on their information-seeking habits and, as a result, their development of digital literacy. Students have a moderate level of information literacy. The average shows that students can employ keywords in search engines and have some digital skills. Students have a moderately poor level of proficiency in identifying false information and evaluating the credibility of sources. The information-seeking behavior was strongly positively correlated with the digital literacy. The relationship of education and age was positively correlated with digital literacy but the results were not statistically significant. The study concludes that digital divide between information-seeking practices can be circumvented by using interventions that are focused. Part of the effective recommendations includes the incorporating digital literacy courses into the curriculum, and establishment of low cost digital hubs.

Keywords: Digital literacy; information seeking behavior; Searching; Challenges

1. Background Study

Digital literacy, broadly defined as the ability to effectively and critically navigate, evaluate, and create information using a range of digital technologies, has evolved significantly since its conceptualization in the late 20th century. Initially emerging in the 1990s amid the rise of personal computers and the internet, it was often equated with basic computer skills, such as operating software or typing. However, upon the expansion of digital ecosystems with the advent of smartphones, social media, and cloud computing, it was augmented to embrace critical thinking, ethical online behavior, consciousness of data privacy, and capacities to distinguish between credible and fake information. It has now become a more fundamental skill in the educational realm, one equivalent to traditional literacy. Digital literacy has become a foundation of educational achievement due to the fast introduction of digital technologies into the education field. Digital literacy has been transformed to mean the possibility of access, interpretation, and application of digital information (UNESCO, 2020) and for students it is a way to negotiate the information available online, to interpret information, and to learn in the modern learning environment.

The relation of information-seeking behavior with digital literacy is significant. Information-seeking behavior can be defined as the steps that people take to find, access and use information, which, most frequently, are digital, such as search engines, social media, or online databases. The way in which individuals recognize, find, examine and utilize information to satisfy their knowledge needs or solve specific problems is known as information-seeking behavior (Wilson, 2000). The emerging digital literacy emphasizes on the information-seeking behavior in that the person learns how to discover and utilize information to solve his/her needs. Restraints such as lack of bandwidth of the internet, dealing with sources and cultural dynamics typify the information-seeking process. The proposed study looks at the effect of these information seeking behaviors on digital literacy levels among students.

Pakistan is a country with the digital divide as one of its characteristics and the rural Sindh is one of the most troublesome. The second largest province in Pakistan, Sindh has more than 50 million population 60 percent live in the rural setting, where it is characterized by poverty, inadequate infrastructure and low levels of education (Pakistan Bureau of Statistics, 2024). The Sindh province of Pakistan is characterized by a diversified social-economic setting where the rural areas have been characterized by significant issues on the delivery of education and assimilation of technology. The rural libraries of the rural colleges which are mostly underfunded and understaffed are a hotbed of knowledge dispensation in the rural areas. Nonetheless, the issue of the digital divide, which is worsened by a lack of infrastructure, poverty, inadequate literacy levels, etc. limits access to digital resources of underprivileged students. According to the report by the Pakistan Telecommunication Authority (2023), the Sindh rural households are able to have reliable internet connectivity only by 27% of households as opposed to 62% in urban areas. This disproportion robs the students of the opportunities to use digital channels, which are essential to the 21 st century education and career achievement.

Using the information-seeking behavior, when introduced to the context of underprivileged students in Sindh, is a highly important measurement of how the concept of being some sort of digital literacy is constructed by the underprivileged students as the degree to which they can cope with information sources directly impacts their academic achievements and digital literacy. Less research is conducted about the digital literacy among impoverished learners of the rural Sindh community. This research will provide region-specific insights into

relationship of digital literacy and information-seeking behavior and how this outcome relationship can inform the interventions in education.

2. Research Questions

1. What is the current level of digital literacy among underprivileged students in Sindh?
2. What are the primary sources, methods, and frequency of information-seeking behavior used by underprivileged students in Sindh?
3. To what extent does information-seeking behavior influence or correlate with digital literacy levels among these students?

3. Literature review

3.2 Digital Literacy

Digital literacy is defined as the ability to effectively and critically navigate, evaluate, and create information using digital technologies (Gilster, 1997), is a cornerstone of modern education. According to Digital Literacy Framework by UNESCO (2024), such competencies as online navigation, a possibility to evaluate the quality of sources, and a possibility to produce digital material are the main requirements to becoming an academic which allows obtaining academic success and finding a job. Studies have been conducted all over the globe that digital literacy serves to reduce disparities, particularly to the disadvantaged groups of individuals (Hargittai, 2010).

Over the past 30 years, digital literacy has undergone considerable development. Beginning as a set of technology skills around using a computer, it has now become a multifaceted concept that possesses cognitive, critical and socio-cultural elements. Paul Gilster's definition of digital literacy, coined by him, was the ability to access and make use of information from multiple digital sources, rather than using technological devices (Gilster, 1997). This concept went beyond technical skills to cognitive skills in dealing with information. This definition was refined over time. David Bawden proposed to understand digital literacy as an extension of information literacy in terms of critical analysis of information, evaluation of information sources and decision making in digital environments (Bawden, 2001). This defined digital literacy in an epistemic framework of knowledge construction and use. Today, we have a conception of digital literacy as a mix of technical, cognitive and ethical skills for effective use of the digital environment (UNESCO, 2020). From skills to access, evaluate, create and share knowledge in an ethical manner such as checking privacy settings and being a good citizen online.

What's more, we know that digital literacy is not universally accessible. Hargittai (2010) highlighted that inequalities in digital skills (or "second-level digital divide") remain despite the provision of computer access. In emerging areas, these digital skill inequalities are further related to technological infrastructure, socioeconomic and educational inequalities. In Sindh, inequalities are manifest through lack of access to good quality internet, lack of quality technological infrastructure and lack of technological support, which limits possibilities for developing higher-level digital skills.

3.3 Information-Seeking Behavior

Information-seeking behavior (ISB), an integral component of Library and Information Science (LIS), provides an avenue to study human-technology relations. Meanwhile, the landmark model proposed by T. D. Wilson suggests that ISB is an interactive process that is influenced by psychological, social and environmental factors. Specifically, as points out by Wilson, the pursuit of information is not necessarily pragmatic but also influenced by contextual factors that include access, motivation and barriers. The information seeking behavior can be described as the procedure by which individuals acquire, find the information and apply it to meet their need (Wilson, 2000).

Information Search Process (ISP) model present by Kuhlthau (1991) also investigated this behavior. The ISP model presents a series of steps: initiation, selection, exploration, formulation, collection and presentation, which explain the process of information search by people, with a special focus on emotional and cognitive overview. The reason is that to the poor students these are different stages which are subject to extraneous variables like access to other resources and experience. The model includes importance of uncertainty and confidence in information seeking, which is important for novice digital information users.

Ellis (1989) model gives additional emphasis to the strategy of chaining (following leads established) that is a frequent resource limited group implementation. It has a problem of introducing misinformation, as students are not taught about how to evaluate the credibility of sources. According to the literature, there is a need to learn these behaviors in order to develop interventions that are in line with the practices, which already have been embraced by the students such as employing mobile platforms to seek information with directions. These are especially pertinent in a digital space where information seeking occurs with non-sequential and networked information structures. These models should be transformed for particular contexts such as areas of limited resources like rural Sindh. Information seeking tasks can be employment-oriented, along with constraint-driven due to lack of access to library resources, ICT infrastructure (power, internet resources) and socio-cultural constraints. As a result, students might pursue more adaptive behaviors such as using more primary search engines, seeking information from their peers, etc.

Structural and socio-economic conditions are major drivers of information seeking in developing countries. In this case, Al-Suqri (2011) argued that people would probably view seeking process to be influenced by the criteria of accessibility, affordability and availability as opposed to choice. Empirical studies enhance this point in South Asia and the like. According to Howlader (2019), the undergraduate students in developing contexts have primarily utilized search engines and informal networks since the academic resources are usually unavailable in their context.

3.3 Information seeking and digital literacy

An emerging body of literature suggests information-seeking behavior is a key component of digital literacy. Applicants engage in various information-seeking tasks which provide a platform for them to engage with technologies, learn search strategies and apply evaluation techniques. In this way, an applicant's information-seeking behavior can be seen as a means of demonstrating "current" digital literacy skills, while offering opportunities for skill development.

Noh (2016) examined the influence of digital literacy skills on information use behavior, empirically found a high influence of digital literacy, particularly information processing and evaluation skills.

Youngee, (2016) examined the effect of digital literacy on information use behavior. Evaluation areas applied in this study are roughly classified into technical literacy, bit literacy, and virtual community literacy, and each of these has five sub-groups. Bit literacy influences information use behavior most, followed by virtual community literacy and technical literacy in that order. Bit literacy is related to the ability to use information including information search, information discernment, editing information, processing information, and utilizing information, and these items appear to have influenced information use behavior most. Examination of these detailed items shows that the ability to process information has the most significant effect on information use behavior followed by information discernment, information editing, community analysis, document editing, and use of tools and ability to create cyber culture in that order. The literacy indicators with the lowest effect on information use behavior were the ability to communicate, form self-identity, information search, and form relationships in that order.

Khan and Khan (2020) also highlights infrastructural constraints like bad internet connectivity, low level of ICT infrastructure development as important constraints to the information-seeking behavior. Besides, Ahmed et al. (2021) experienced a big reliance on unprofessional sources such as social media and personal connections and could limit access to authoritative and reliable resources.

Similar findings are also made in the context of digital health literacy. For example, Dadaczynski et al. (2021) found that individuals with higher digital literacy are more likely to engage in higher order information seeking strategies such as seeking information through official websites and evaluating information credibility. Entering the digital age without high digital literacy, on the other hand, means using "convenient" websites such as social media where misinformation can be found.

Haider and Chen (2021) claim that students are increasingly engaging in the digital tools in Pakistan but they usually lack the necessary skills to utilize the resources and be able to retrieve and assess information efficiently. Similarly, Khanum and Bashir (2021) found that students have low utilization levels of learning materials and resources and they should be trained to use them effectively to enhance their digital skills.

In a systematic review, Tinmaz et al. (2022) noted a high overlap in the definition of digital literacy and information competencies, suggesting an association between these two concepts.

Humbhi et al. (2022) on the same note identified barriers such as low internet connectivity, low ICT infrastructures, and absence of knowledge on information systems library among others as some of the prevailing factors into information seeking behavior. What is more, these constraints, according to the literature, can lead to some form of surface-seeking of information, which consists of a fast search and minimal source evaluation. Even though effective in the short-run, the behavior can influence the acquisition of higher levels of digital literacy, particularly in the area of critical thinking and information validity.

4. Research Methodology

To offer a thorough picture of the research problem, a quantitative research approach has been utilized. The quantitative study assessed the level of digital literacy and examined the trends in the information seeking behavior. The design is also appropriate to rural Sindh because of the small amount of previous research, there is a need to view the research systemically to find out trend and realities. A structured questionnaire was used to collect data from students. A survey questionnaire was created to assess the degree of digital literacy and information seeking behavior. The survey includes two scales. Digital Literacy Scale is grounded in Digital Literacy Framework presented by Ng (2012) and it examined the following kinds of competencies: searching online, e.g., sources evaluation and using digital tools (e.g. Google Scholar, email) etc. The information seeking behaviour is grounded in the ISP model of Kuhlthau (1991) where there are phases of information seeking (e.g., initiation, exploration) and sources of information choice (e.g., peers, mobile apps).

4.1 Population and sampling

The students in colleges in rural Sindh were the target population. The study is focused on the colleges in three rural districts of Sindh, Badin, Thatta and Larkana. Multi-stage sampling approach was used. Firstly, purposive sampling approach was employed to determine six colleges (2 per district) in which libraries were functioning and to ensure that both the male and female students were represented. Second, stratified random sampling is used to choose 300 students (50 students in each college) to enable the consideration of gender differences that are evident in the literature (Fatima and Rehman, 2022).

4.2 Data Collection and analysis

The questionnaire was created in Google Form. The data was either collected in-person or mobile-based Google Forms as it is the most prevalent approach to the internet among students. The link of the Google Form was sent through WhatsApp.

Survey data was analyzed with Statistical Package for the Social Sciences (SPSS). For analysis of data, both the descriptive and inferential statistics were used. The digital literacy and information seeking patterns are summarized by using descriptive statistics (e.g., means, frequencies percentages and standard deviation). Inferential statistics was applied to determine the relationship between the information seeking behavior and digital literacy. Pearson correlation was applied to check this relationship

5. Results

5.1 Demographic Characteristics of respondents.

The study sample comprised of mainly of undergraduate students pursuing studies in universities and colleges in the Sindh province. Out of the 200 respondents, the majority of them were male (n=156, 78%) compared to female who comprised a smaller number (n=44, 22%).

Out of the 200 sampled a significant fraction (n = 128, 64%) were of government (public-sector) colleges or universities, with the other (n = 72, 36%) to private colleges or universities.

The age range reported in the study sample is incredibly narrow to capture the younger age and reflective of the demography of an average or traditional undergraduate student at undergraduate institutions of the public sector. Out of the total 200 respondents, the largest proportion belonged to the 18–21 age group (n = 83, 41.5%), followed by the 22–25 age group (n = 59, 29.5%). The share of 29 was found to be the same between the age group 14-17years and 26 and above.

The fact that the sample is largely dominated by the degree classes (55%), could only mean that the sample is more likely to be composed of students who have already successfully completed the intermediate level to the undergraduate level tertiary level courses.

Geographic distribution of the study sample indicates that the sample constitutes adequate percentage of the rural areas since students struggling socioeconomically to higher education have to obtain higher education of rural distinguishing background. The greatest percentage of 48.0% (n = 96) was among 200 respondents in the rural area, followed by urban areas (n = 76) and semi-urban area (n = 28).

Table 1: Demographic details of respondents

Type of institution	Frequency	Percentage
Government	128	64%
Private.	72	36%
Gender of respondents		
Male	156	78%
Female	44	22%
Age of respondents		
18-21 Years	29	14.50%
18-21 Years	83	41.50%
22-25 Years	59	29.50%
26 years and above	29	14.50%
Geographic distribution		
Rural areas	96	48%
Semi-urban areas	28	14%
Urban areas	76	38%
Total	200	100%

5.2 Searching practices

The findings in the traits of the searched behavior, the mean score reveal that a middle range proactive information-seeking behavior is used by the respondents where the search process is constrained by excessive use of the powerful search engines and social media sites. The moderate level means score implies that respondents follow links. Respondents differentiate between useful and less use sources. Respondents monitor websites with less frequency.

Table 2: Frequency of searching practices

Statement	Mean	SD	Interpretation
I start searching by using Google or other search engines	4.32	0.81	Very High agreement
I browse websites or social media to discover new information	4.15	0.89	High
I follow links from one source to related sources	3.68	1.02	Moderate-High
I differentiate between useful and less useful sources quickly	3.41	1.12	Moderate
I regularly monitor specific websites/apps for updates	3.22	1.18	Moderate-Low

5.3 Use of Information Sources

The results regarding the preferred sources of digital information have indicated that apparently overweight of the informal and easy available sources of information which include social media, YouTube and Google. Small numbers of the respondents use formal academic databases and scholarly repositories. Most sought-after (far and away) are information search generic tools: Google becomes the gateway to numerous rapid and convenient searches, and as a supplement to those searches, YouTube is the most-visited resource to find a visual demonstration, a lesson and any other educational content, social media sites (i.e., Facebook, WhatsApp, etc.). Conversely, academic online collections, the ones that the Higher Education Commission (HEC) Digital Library subscribes to (e.g. JSTOR, SpringerLink, PubMed, IEEE Xplore or even local collections, e.g. Pakistan Research Repository) have low use.

Table 3: Use of information sources

Source of information	Frequency	Percentage (%)
Google/Search engines	198	93.4
YouTube	176	83.0
Social media (FB, WA, TikTok)	162	76.4
Wikipedia	134	63.2
Friends/family	112	52.8
Official websites	89	42.0
University library databases	45	21.2

5.4 Barriers to Information Searching

The respondents indicated that perceived barriers to access and use of digital resources in seeking information had high scores. The mean scores show that the underprivileged students in Sindh have experienced significant barrier that seriously impacts their information-seeking behavior and, consequently, the acquisition of digital literacy skills.

Table 4: Barriers to information searching

Statement	Mean	SD	Interpretation
Poor internet connection makes it hard	4.48	0.76	Very High

High data costs limit my online searching	4.41	0.82	Very High
Language barriers (English content)	4.12	0.94	High
I lack skills/training for advanced tools	3.95	1.05	High

4.5 Levels of Digital Literacy Skills

The level of information literacy skills among students is moderate. The overall level of digital literacy among the disadvantaged students of Sindh was mostly in the mid-range with the mean of 3.38 (SD = 1.05). The mean value for finding information online shows moderate level (M=3.58). The mean indicates that students do possess some digital skills, and can use keywords in search engines. They can protect personal information but its level is moderate. Student's level of skills for judging reliability of sources and recognizing misinformation is moderately low.

Table 5: Levels of Digital Literacy

Digital literacy	Mean	SD	Interpretation
Finding information online (overall)	3.58	1.01	Moderate
Using right keywords in search engines	3.72	0.98	Moderate-High
Protecting personal information online	3.28	1.18	Moderate
Judging reliability of sources	3.19	1.14	Moderate-Low
Recognizing fake news/misinformation	3.05	1.22	Moderate- Low

5.6 Relationship between Information-Seeking Behavior and Digital Literacy

Pearson correlation was used to explore the relationship of information seeking behavior and digital literacy. Positive relationship was found between information seeking practices and digital literacy levels. The higher the literacy level, the higher the level of information seeking practices. The relationship of age and education with digital literacy was positive but it was not statistically significant.

Table 6: Relationship between information seeking and digital literacy

Variable	Digital literacy Value of Pearson coefficient	Sig.
Information searching practices	0.542**	0.000
Age	0.081	0.678

Education	0.084	0.723
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6. Findings

According to the results of the characteristics of the sought behavior, the mean score indicates that the respondents utilize a middle-range proactive information-seeking behavior where the search process is limited by overuse of social media and powerful search engines. These trends represent not only an adaptive response to the nature of the resource limitations but also demonstrate the restrictiveness of such strategies in terms of paying deep attention to learning and critical engagement with information.

Perceived obstacles to using digital resources to obtain information were rated highly by the respondents. The average results demonstrate that Sindh's poor pupils face substantial obstacles that have a negative influence on their information-seeking habits and, as a result, their development of digital literacy.

Students have a moderate level of information literacy. The general level of digital literacy among Sindh's underprivileged students was primarily in the middle range. The average score for obtaining information online is moderate (M=3.58). The average shows that students can employ keywords in search engines and have some digital skills. They have a moderate level of protection for personal data. Students have a moderately poor level of proficiency in identifying false information and evaluating the credibility of sources.

The information-seeking behavior was strongly positively correlated with the digital literacy. The relationship of education and age was positively correlated with digital literacy but the results were not statistically significant.

7. Conclusion

This can be concluded because the moderate scores of students in Sindh as digital literate. Active information search becomes an important source of the development of digital skills in resource deprived environments. There is a need to bridge the digital divide by solving behavioral patterns and surmounting infrastructural barriers that render certain students imminently incapable in order to empower them both in the academic, professional and social realm of a digital era. The findings highlight that the information-seeking behavior may be enhanced as a financially resourceful driver to become more digital literate without necessarily having to create big changes to the infrastructure. The conceptual models of information seeking framework by Ellis are relatively justified through the models and are appropriate to the digital setting of developing countries. Its practical implications are to encourage behavior change policies in the Sindh-based education system, to help reduce the digital divide and promote a diverse society with varying opportunities to grow.

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